

FIVE-YEAR REVIEW REPORT

**Second Five-Year Review Report
for
Fairfield Coal Gasification Plant Site**

**City of Fairfield
Jefferson County, Iowa**

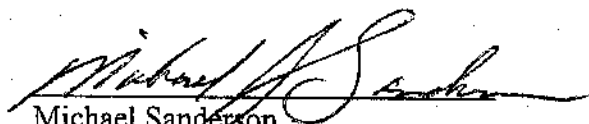
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Five-Year Review Report

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List of Acronyms

| | |
|--------|---|
| AOC | Administrative Order of Consent |
| ARAR | Applicable or Relevant and Appropriate Requirements |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| DNAPL | Dense Non-Aqueous Phase Liquid |
| EPA | United States Environmental Protection Agency |
| FCGP | Fairfield Coal Gasification Plant |
| HAL | Lifetime Health Advisory Level |
| IC | Institutional Control |
| IDNR | Iowa Department of Natural Resources |
| IE | Iowa Electric Power and Light Company |
| MCL | Maximum Contaminant Level |
| MCLG | Maximum Contaminant Level Goal |
| MNA | Monitored Natural Attenuation |
| NCP | National Contingency Plan |
| NPL | National Priorities List |
| NRL | EPA Negligible Cancer Risk Level |
| O&M | Operation and Maintenance |
| PAH | Polycyclic Aromatic Hydrocarbons |
| PDL | Practical Detection Level |
| PRG | Preliminary Remediation Goal |
| PRP | Potential Responsible Party |
| RA | Remedial Action |
| RAO | Remedial Action Objective |
| RD | Remedial Design |
| RI | Remedial Investigation |
| RI/FS | Remedial Investigation/Feasibility Study |
| ROD | Record of Decision |
| RPM | Remedial Project Manager |
| VOC | Volatile Organic Compound |

Executive Summary

The major components of the selected remedy for the Fairfield Coal Gasification Plant site in Fairfield, Iowa, included: excavation and incineration of source material and contaminated soil; bioremediation pilot study and potential full-scale in-situ bioremediation of subsurface contaminated soil and ground water; placement of deed restrictions on site property; and extraction and treatment of contaminated ground water. The site achieved construction completion with the signing of the Preliminary Close Out Report on August 24, 1995. The trigger for this five-year review was the previous five-year review report submitted on October 3, 1997.

The assessment of this five-year review found that the remedy implemented was in accordance with the requirements of the Record of Decision (ROD). A change occurred in the selected remedy with the termination of the in-situ bioremediation process. In addition, a one-year trial is currently being conducted to determine if monitored natural attenuation (MNA) could effectively replace the pump and treat system. Immediate threats have been addressed through the excavation and incineration of contaminated soil, as well as the installation of fencing, warning signs, and institutional controls. The ground water remedy is expected to remain protective as long as the contaminated ground water plume is contained on site. The long-term protectiveness of the remedial action will be verified by continuing to obtain additional ground water samples which will fully evaluate potential migration of the contaminant plume from the site.

Five-Year Review Summary Form

| SITE IDENTIFICATION | | |
|--|--|----------------------------------|
| Site name (from WasteLAN): Fairfield Coal Gasification Plant | | |
| EPA ID (from WasteLAN): IAD981124167 | | |
| Region: 07 | State: IA | City/County: Fairfield/Jefferson |
| SITE STATUS | | |
| NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify) _____ | | |
| Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input checked="" type="checkbox"/> Complete | | |
| Multiple OUs? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO | Construction completion date: 08/24/95 | |
| Has site been put into reuse? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO | | |
| REVIEW STATUS | | |
| Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency _____ | | |
| Author name: Tonya Howell | | |
| Author title: Remedial Project Manager | Author affiliation: U.S. EPA, Region 7 | |
| Review period:** 10/11/ 01 to 09/23/ 02 | | |
| Date(s) of site inspection: 06/27/2002, 7/17/2002 | | |
| Type of review: <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead </div> <div style="display: flex; justify-content: space-around; margin-top: 5px;"> <input type="checkbox"/> Regional Discretion </div> | | |
| Review number: <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify) _____ | | |
| Triggering action: <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> Actual RA Onsite Construction at OU # _____ <input type="checkbox"/> Actual RA Start at OU# _____ </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report </div> <div style="display: flex; justify-content: space-between; margin-top: 5px;"> <input type="checkbox"/> Other (specify) _____ </div> | | |
| Triggering action date (from WasteLAN): 10 / 03 / 97 | | |
| Due date (five years after triggering action date): 10 / 03 / 02 | | |

* ["OU" refers to operable unit.]

** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues:

A section of fence was damaged on the eastern side of the property.

No sign was posted on the fence designating the enclosure as a Superfund site.

Trees were observed growing along the fence line.

Recommendations and Follow-up Actions:

Alliant Energy agreed to repair the section of fence that had been damaged as soon as possible.

Warning signs will be posted on the fence after EPA has a chance to revisit the wording that is necessary and appropriate.

Trees along the fence are scheduled to be removed on a regular basis. Increasing the frequency of the tree removals around the perimeter per year is being considered by Alliant Energy.

Protectiveness Statement(s):

All immediate threats at the site have been addressed, and the remedy is expected to be protective of human health and the environment as long as the contaminated ground water plume remains contained on site either through the current ground water treatment system or possibly monitored natural attenuation.

Other Comments:

After the trial period for monitored natural attenuation (MNA), a decision will be made by EPA on whether or not MNA would be a more efficient remedy than the current pump and treat ground water system.

Alliant is in the process of constructing an electrical substation on the site. Current fencing will remain in place, with an additional inner fence encircling the actual substation.

**Fairfield Coal Gasification Plant
Fairfield, Iowa
Second Five-Year Review Report**

I. Introduction

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, five-year review reports identify issues found during the review, if any, and identify recommendations to address them.

The Agency is preparing this five-year review report pursuant to the Comprehensive Environmental Response, Compensation, & Liability Act (CERCLA) §121 and the National Contingency Plan (NCP). CERCLA §121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgement of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

The Agency interpreted this requirement further in the NCP; 40 CFR §300.430(f)(4)(ii) states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such action no less often than every five years after the initiation of the selected remedial action.

The United States Environmental Protection Agency (EPA), Region 7, conducted the five-year review of the remedy implemented at the Fairfield Coal Gasification Plant (FCGP) site in Fairfield, Iowa. This review was conducted by the Remedial Project Manager (RPM) for the entire site from October 2001 through September 2002. This report documents the results of the review.

This is the second five-year review for the Fairfield Coal Gasification Plant site. The triggering action for this statutory review is the previous five-year review report dated October 3, 1997. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels which allow for unlimited use and unrestricted exposure.

II. Site Chronology

Table 1 - Chronology of Site Events

| EVENT | DATE |
|--|-----------------|
| Study for IE found PAH compounds in soil and ground water on the site. | 1986 |
| Study for EPA confirmed elevated levels of PAHs adjacent to the old FCGP site; and concentrations of PAHs, metals and cyanide were detected in soil samples south of the site. | 1987 |
| Proposed for EPA National Priorities List. | June 1988 |
| IE and EPA entered into an AOC to construct and operate an interim ground water treatment system and conduct a RI/FS. | April 1989 |
| The construction of extraction well #1 and #2 was completed. | December 1989 |
| Startup of the interim ground water recovery and treatment system. | January 1990 |
| RI/FS completed. | 1990 |
| Proposed plan identifying EPA's preferred remedy presented to public; start of public comment period. | July 1990 |
| Final listing on EPA National Priorities List. | August 1990 |
| ROD selecting the remedy is signed. | September 1990 |
| Consent Decree signed between EPA and responsible party to complete Remedial Design. | March 1991 |
| Two-year pilot using an in-situ bioremediation treatment system was started. | December 1991 |
| EPA approved PRP Remedial Design. | 1992 |
| Final Operations and Maintenance Manual submitted to and approved by EPA. | March 1992 |
| Final inspection of ground water remediation facilities conducted by EPA and approved. | November 1992 |
| Construction completion of ground water extraction and treatment system. | 1993 |
| In-situ bioremediation pilot study terminated. | May 13, 1993 |
| Remediation of coal tar source material and contaminated soil commenced. | June 1993 |
| Completed excavation of all contaminated source material and contaminated soil. | April 1995 |
| Coal tar source material remediation completed. | June 1995 |
| Completed the treatment and discharge of all contaminated pit water and surface water. | June 1995 |
| Completed all site restoration activities. | July 1995 |
| Conducted pre-final inspection. | July 1995 |
| Preliminary Close Out Report signed. | August 24, 1995 |
| First Five-Year Review completed. | October 3, 1997 |
| Pump and Treat system temporarily shut-off for one-year trial using monitored natural attenuation. | July 30, 2001 |

III. Background

Physical Characteristics

The FCGP site property is located in Fairfield, Iowa, a town of approximately 10,000 residents, in central Jefferson County. The address of the site is 107 South Seventh Street. The legal description is - the southwest 1/4 of the southeast 1/4, Section 26, Township 72 North, Range 10 West of Jefferson County, Iowa.

The 1.3-acre site is bounded on the north by Burlington Street, on the east by residential property, on the south by an electrical substation and a salvage operation, and on the west by Seventh Street and residential property. The area is primarily residential with commercial businesses to the north of Burlington Street.

It was determined during the Remedial Investigation/Feasibility Study (RI/FS) that the site stratigraphy is fill overlying glacial till consisting of interbedded silty clays and silty sands with minimal sand and gravel lenses. Bedrock was sampled at a depth of 77 feet and consisted of 2.5 feet of thin-bedded shale. Analysis of the hydrogeologic data identified two ground water systems present in the site area: 1) a localized perched system within the fill; and 2) an unconfined system within the underlying silty clays and silty sands above the shale bedrock.

Land and Resource Use

The historic land use of the site has involved electric utilities since at least 1878. From 1878 until 1950, operations involved the production of gas. The plant utilized a blue gas process until 1937 when the production was changed to a carbureted water gas process. Blue gas (sometimes called coal gas) was produced by reacting coal or coke with steam to yield a gas rich in hydrogen and carbon monoxide. The heating value of blue gas is enriched by adding petroleum oils. The blue gas is then thermally cracked to gaseous constituents known as the carburetion process. The resulting product is known as carbureted water gas or simply “water gas”. Coal tar sludge, iron oxide wastes, and associated coal gasification wastes were generated at the plant during operations.

In 1950, the gas production system in Fairfield was converted to natural gas. Operations at the manufactured gas plant were terminated, and the interior of the building was modified for use as an operations facility for Iowa Electric Power and Light Company (IE), later known as IES Utilities. IE discontinued using the location as a base for natural gas and electrical distribution systems maintenance operations in 1988.

The FCGP site is now owned by Alliant Energy which merged with IES Utilities in 1998. Current land use for the surrounding area is residential and commercial. The site itself is fenced, and an electrical substation is currently being installed on site. The dominant ground water flow direction is to the southeast, and the ground water aquifer underlying the site is currently not being used as a drinking water source.

History of Contamination

The main features associated with the FCGP site are three gas holders, the operations building, the 1927 tar separator and purifier pit, the 1937 tar separator, the former railroad right-of-way, and the former ditch area south of the site. While in operation, most of the coal tar sludge produced was sold as a by-product. An undetermined amount of coal tar sludge was disposed in the gas holder pit, the 1927 tar separator and purifier pit, and the relief gas holder. Compounds commonly found in coal tar include polyaromatic hydrocarbons (PAHs), benzene, ethylbenzene, toluene, and xylenes (BETXs).

In a 1986 study for IE, PAH compounds were found in both the soil and ground water on site. In a 1987 investigation for the EPA, elevated levels of PAHs were confirmed immediately adjacent to the old FCGP site; and concentrations of PAHs, metals, and low concentrations of cyanide, were detected in soil samples collected in the drainage ditch south of the site.

Site contamination was the result of on-site disposal of waste by-products generated from the production of coal gas. The waste by-products, referred to as “coal tar”, were disposed or left in in-ground containment structures such as the gas holder pit, tar separator, and relief gas holder. According to the RI, these are the three most probable sources of ground water contamination at the FCGP site. In addition to the areas of source contamination identified in the RI, additional source areas which included purifier pits, pipe chases, a second tar separator, and a tar well were discovered during the Remedial Action (RA). The highest concentration of contaminants identified at the site was detected in a sediment sample collected from the gas holder pit.

Initial Response

The FCGP site was proposed as a candidate site for the National Priorities List (NPL) in June 1988 and became a final NPL site in August 1990. In April 1989, IE and EPA entered into an Administrative Order on Consent to construct and operate an interim ground water treatment system and conduct a RI/FS for the FCGP site. During 1990, the RI/FS was completed and a Record of Decision (ROD) was signed for the site.

Basis for Taking Action

Contaminants

The principal threat at this site was buried coal tar waste that had migrated off site. Volatile organics and polynuclear aromatic hydrocarbons had leached from the tars into the ground water. Thirty chemicals were identified in the risk assessment at the site in both soil and ground water. From these potential contaminants of concern, clean-up standards were established for the following hazardous substances.

| | |
|--------------|----------|
| PAHs | Barium |
| Cyanide | Cadmium |
| Benzene | Chromium |
| Ethylbenzene | Lead |
| Toluene | Mercury |
| Xylene | Selenium |
| Arsenic | |

The EPA determined that the actual or threatened release of hazardous substances from the FCGP site, if not addressed, might present a current or potential threat to the public health, welfare, or the environment. Carcinogenic risks were highest for future off-site residents due to carcinogenic PAHs. Non-carcinogenic hazards were also highest for future off-site residents through the ground water pathway.

IV. Remedial Actions

Remedy Selection

The ROD for the FCGP site was signed on September 21, 1990. Remedial Action Objectives (RAOs) were developed as a result of data collected during the RI to aid in the development and screening of remedial alternatives to be considered for the ROD. The RAOs for the FCGP site are listed below.

- Remove or contain contaminated source area materials in order to: a) minimize the potential for ingestion, dermal contact, and inhalation of materials containing concentrations of carcinogenic PAHs in excess of 100 parts per million (ppm); and b) reduce the potential for further migration of contaminants from these units.
- Prevent or minimize the potential for future inhalation, ingestion, or dermal contact with contaminants in ground water in excess of action levels.

The major components of the soil control remedy selected in the ROD included the following.

- Excavation of contaminated soil from the relief gas holder pit, tar separator, and relief gas holder.
- Removal of free liquids from the excavation for on-site treatment.
- Off-site incineration/thermal destruction of contaminated soil.
- Separation of solid waste for off-site disposal as hazardous or non-hazardous waste, as appropriate.

- Bioremediation pilot study and potential full-scale in-situ bioremediation of subsurface contaminated soil.

The major components of the ground water control remedy selected in the ROD included the following.

- Pumping of ground water from the entire zone of contaminated water.
- On-site treatment of contaminated ground water and discharge to the municipal sanitary sewer. The treatment process includes sedimentation, filtration, and activated carbon polishing. The generated sludges are dried with a filter press and disposed off site.
- Ground water monitoring.
- ReInjection of a portion of the treated ground water as needed for a bioremediation pilot study.

The selected remedy in the ROD consisted of the excavation and off-site incineration of the source areas and contaminated soil, used in combination with a filtration, polymer injection and settling, and carbon adsorption process to treat the contaminated ground water. Ground water was monitored on a quarterly basis for three years, then reverted to semi-annual monitoring to ensure the plume was not migrating from the Alliant Energy property. A pilot study utilizing enhanced in-situ bioremediation was also proposed for treating the contaminated ground water, but was terminated after 18 months due to unfavorable hydrogeological site conditions, minimal positive results, and a lack of reasonable system modification options.

Institutional controls (ICs) are part of the remedy at the FCGP site. The site is required to be fenced and marked with a warning sign in a conspicuous place. Ground water and land-use restrictions are implemented to prevent activities which would provide contact with contaminants. As part of the remedy, any deeds, titles, or other instruments of conveyance regarding the site must include a notice stating that the premises are subject to these restrictions. These ICs are established through a Consent Decree: *Consent Decree, the United States of America v. Iowa Electric Light and Power Company, dated August 14, 1991*.

Remedy Implementation

IE signed a Consent Decree with EPA on March 29, 1991, to complete a Remedial Design (RD) and a RA as prescribed in the ROD. The EPA approved the RD in 1992. The RA for the ground water RA was completed in January 1993, and the RA for the source material and contaminated soils was completed in August 1995.

Remediation of coal tar source material and contaminated soil commenced in June 1993 and was completed in June 1995. Approximately 8,280 tons of contaminated soil and source

material determined not to be the Resource Conservation and Recovery Act (RCRA) hazardous waste was excavated and transported off site for incineration. The material was temporarily stored at secured facilities in Marshalltown and Iowa Falls, Iowa. Subsequently, this contaminated soil was permanently disposed at the Illinois Power, Baldwin Station where it underwent thermal treatment in the utility boiler located at that facility. Approximately 580 tons of RCRA hazardous source material were excavated and disposed of at Missouri Fuel Recyclers located in Hannibal, Missouri. This material underwent thermal treatment (incineration) while being used as a fuel supplement for the production of portland cement.

IE completed construction of a ground water extraction and treatment system in December 1989. The treatment system was originally designed as an interim treatment system, and was subsequently modified and approved by EPA as a permanent ground water treatment system. Minor modifications were made to the system following construction completion, and the system was temporarily shut down for two weeks and moved to a new building located on the south side of Washington Street. Treatment system effluent monitoring, sewer outfall monitoring, and ground water monitoring are scheduled to occur on a semi-annual basis.

An in-situ bioremediation treatment system, designed to enhance the reduction of subsurface contamination, was started in December 1991. Due to the innovative nature of the treatment technology, a pilot-scale system was designed and constructed to allow for a two-year trial treatment period. Subsequent evaluations of the pilot-scale system concluded that the in-situ biotechnology was not effective due to the nature of hydrogeologic conditions at the site. Therefore, the pilot-scale in-situ bioremediation system was terminated after 18 months, and the decision was made to cancel any future in-situ bioremediation for the site.

Site restoration activities were completed in July 1995. Operation and maintenance activities are conducted on a regular basis and primarily consist of inspections of the ground water treatment system and the fence which restricts access to the FCGP site.

The site achieved construction completion status when the Preliminary Close Out Report was signed on August 24, 1995.

The EPA and the state have determined that all RA construction activities, including the implementation of ICs, were performed according to specifications. It is expected that the contaminated ground water plume will continue to remain contained on site, either through the ground water treatment system or possibly monitored natural attenuation (MNA).

System Operation/Operation & Maintenance

Alliant Energy is conducting long-term monitoring and maintenance activities according to the Operation and Maintenance (O&M) Plan that was approved by EPA in March 1992. The primary activities associated with the O&M include the following.

- Sample and analyze effluent from the ground water treatment system and the lead carbon column.
- Routinely inspect the ground water treatment system.
- Pick up all trash and unsightly items around the site and place them in their proper places or in appropriate trash receptacles.
- Check the extraction well manhole, the injection well, monitoring wells, doors, gates, and fences around the site. Make sure they are in good repair and locked as necessary. Repair or replace any items that are broken or that have deteriorated.
- Inspect the interior and exterior lighting around the site. Replace any broken or burned out bulbs, as necessary.
- Inspect the surface of the backfilled source areas for erosion and uneven settlement. Eroded areas will be filled with clean top soil and properly compacted.

Table 2 - Annual System Operations/O&M Costs

| Dates | | Total Estimated Cost rounded to the nearest \$1000 | Actual Total Cost rounded to nearest \$1,000 |
|--------------|---------------|---|---|
| From | To | | |
| January 1997 | December 1997 | \$235,700 | \$103,600 |
| January 1998 | December 1998 | \$235,700 | \$95,600 |
| January 1999 | December 1999 | \$235,700 | \$53,300 |
| January 2000 | December 2000 | \$235,700 | \$79,200 |
| January 2001 | December 2001 | \$235,700 | \$95,000 |
| January 2002 | June 2002 | \$117,850 | \$58,000 |

A major part of the clean up took place between 1993 and 1995 during the excavation and incineration of contaminated soils on site. The other component of the remedy included the construction of a pump and treat system and quarterly/semi-annual monitoring. O&M costs since then have consisted of operating and maintaining the ground water treatment system, ground water monitoring, reporting, ground water-related investigations, and project management associated with the ground water RA. Actual O&M costs over the past five years have been considerably less than the estimated costs. Original estimates prepared in 1990 for the ROD were based on pumping ground water at higher production rates, sampling fewer wells, and implementing enhanced in-situ bioremediation. The changes in site conditions and modifications

to the monitoring and treatment programs have evolved since the remedy's implementation with EPA's acknowledgment.

V. Progress Since the Last Review

The previous five-year review indicated that the existing ground water monitoring system continued to be effective in detecting further migration of the subsurface contamination. In addition, the review found that concentrations of soil contaminants in conjunction with the property access restrictions continued to be protective of human health, welfare, and the environment. Recommendations based on the first five-year review included the continued implementation of semi-annual ground water monitoring, treatment system operation and monitoring, and property access restrictions. No areas of improvement were identified.

VI. Five-Year Review Process

Administrative Components

Alliant Energy was notified of the initiation of the five-year review in February 2002 and the Iowa Department of Natural Resources (IDNR) on April 11, 2002. The FCGP five-year review team was led by Tonya Howell of EPA, RPM for the FCGP site, and included a technical advisor for EPA, an EPA toxicologist, and the five-year review coordinator in the Office of External Programs. Johanshir Golchin of the state assisted in the review as the representative for the support agency.

In March 2002, a review schedule was established whose components included:

- Community Involvement;
- Document Review;
- Data Review;
- Site Inspection;
- Interviews; and
- Five-Year Review Report Development and Review.

The schedule extended through September 30, 2002.

Community Involvement

Activities to involve the community in the five-year review were initiated with a meeting in March 2002 between the RPM and the five-year review community involvement coordinator. A notice was sent to the Fairfield Ledger that a five-year review was to be conducted, and the ad

ran on June 14, 2002. A letter stating the same was sent to approximately 150 media outlets and individuals in the area on June 6, 2002. The letter invited the recipients to submit any comments to EPA.

Soon after the five-year review was signed, a notice was sent to the Fairfield Ledger that announced that the Five-Year Review Report for the FCGP site was complete, and that the results of the review and the report were available to the public at the Fairfield Public Library and the EPA, Region 7, office in Kansas City, Kansas.

Document Review

This five-year review consisted of a review of relevant documents (see Attachment 3). Some of these documents included the previous five-year review, O&M records and monitoring data, and applicable ground water and soil clean-up standards, as listed in the 1990 ROD (see Attachment 4).

Data Review

Routine ground water monitoring has been conducted at the FCGP site since 1993 in order to track the effectiveness of the treatment system. In general, contaminant levels were detected at higher levels early in the sampling regime. The lower levels found in later sampling may be the result of the source removal which took place from June 1993 to June 1995.

Ground water wells were selected to be sampled based on their ability to determine whether or not migration of the contaminated ground water plume was occurring. Therefore, sample results over the past five years have shown concentrations of contaminant trends below the clean-up levels that were established, as well as the lab quantitative levels. These non-detect results confirm that the plume is contained on site, and that the remedy conceptualized in the ROD is proceeding as expected. In July 2001, with the start of the one-year MNA trial, semi-annual sampling was increased to quarterly sampling. In addition, a different array of monitoring wells was chosen to monitor the effects of MNA, including the sampling of two additional new wells which were drilled in 2001.

Table 3a - Semi-Annual Comparison of Ground Water Concentrations (Well No. FI-10)

| Contaminant | Clean-up Level (ug/l) | CONCENTRATION IN PPB | | | | | | | | | |
|-------------|-----------------------|----------------------|-----------|----------|-----------|----------|-----------|----------|-----------|-----------|-----------|
| | | 1-6 1997 | 7-12 1997 | 1-6 1998 | 7-12 1998 | 1-6 1999 | 7-12 1999 | 1-6 2000 | 7-12 2000 | Aug. 2001 | Nov. 2001 |
| Benzene | 1 | < 1.0 | < 1.0 | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 5.0 | < 5.0 |

| | | | | | | | | | | | |
|-----------------------|--------|-------|-------|-------|-------|-------|--------|---------|---------|--------------|--------------|
| Ethylbenzene | 700 | < 1.0 | < 1.0 | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 5.0 | < 5.0 |
| Toluene | 2,000 | < 1.0 | < 1.0 | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 5.0 | < 5.0 |
| Xylene | 10,000 | < 1.0 | < 1.0 | <5.0 | <3.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Naphthalene | 20 | NS | < 1.0 | <1.7 | <0.10 | NS | < 0.09 | < 0.1 | < 0.096 | 0.03 | < 0.1 |
| Benzo(a)pyrene | 0.2 | NS | < 1.0 | <0.11 | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | 0.005 | < 0.1 |
| Benzo(a)anthracene | 0.1 | NS | < 1.0 | <0.11 | <0.10 | NS | < 0.01 | < 0.011 | < 0.011 | < 0.1 | < 0.1 |
| Benzo(b)fluoranthene | 0.2 | NS | < 1.0 | <0.33 | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | < 0.1 | < 0.1 |
| Benzo(k)fluoranthene | 0.2 | NS | < 1.0 | <0.11 | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | < 0.1 | < 0.1 |
| Chrysene | 0.2 | NS | < 1.0 | <0.11 | <0.10 | NS | < 0.03 | < 0.034 | < 0.032 | < 0.1 | < 0.1 |
| Dibenz(a,h)anthracene | 0.3 | NS | < 1.0 | <0.22 | <0.10 | NS | < 0.06 | < 0.069 | < 0.064 | < 0.1 | < 0.1 |
| Indenopyrene | 0.4 | NS | < 1.0 | <0.22 | <0.10 | NS | < 0.01 | < 0.011 | < 0.011 | < 0.1 | 0.024 |

Table 3b - Semi-Annual Comparison of Ground Water Concentrations (Well No. FI-11)

| Contaminant | Clean-up Level (ug/l) | CONCENTRATION IN PPB | | | | | | | | | |
|-----------------------|-----------------------|----------------------|-----------|----------|-----------|----------|-----------|----------|-----------|-----------|-----------|
| | | 1-6 1997 | 7-12 1997 | 1-6 1998 | 7-12 1998 | 1-6 1999 | 7-12 1999 | 1-6 2000 | 7-12 2000 | Aug. 2001 | Nov. 2001 |
| Benzene | 1 | < 1.0 | < 1.0 | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | NS | NS |
| Ethylbenzene | 700 | < 1.0 | < 1.0 | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | NS | NS |
| Toluene | 2,000 | < 1.0 | < 1.0 | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | NS | NS |
| Xylene | 10,000 | < 1.0 | < 1.0 | <5.0 | <3.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | NS | NS |
| Naphthalene | 20 | NS | < 1.0 | <1.7 | <0.10 | NS | < 0.09 | < 0.1 | < 0.096 | NS | NS |
| Benzo(a)pyrene | 0.2 | NS | < 1.0 | <0.11 | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | NS | NS |
| Benzo(a)anthracene | 0.1 | NS | < 1.0 | <0.11 | <0.10 | NS | < 0.01 | < 0.011 | < 0.011 | NS | NS |
| Benzo(b)fluoranthene | 0.2 | NS | < 1.0 | <0.33 | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | NS | NS |
| Benzo(k)fluoranthene | 0.2 | NS | < 1.0 | <0.11 | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | NS | NS |
| Chrysene | 0.2 | NS | < 1.0 | <0.11 | <0.10 | NS | < 0.03 | < 0.034 | < 0.032 | NS | NS |
| Dibenz(a,h)anthracene | 0.3 | NS | < 1.0 | <0.22 | <0.10 | NS | < 0.06 | < 0.069 | < 0.064 | NS | NS |
| Indenopyrene | 0.4 | NS | < 1.0 | <0.22 | <0.10 | NS | < 0.01 | < 0.011 | < 0.011 | NS | NS |

Table 3c - Semi-Annual Comparison of Ground Water Concentrations (Well No. FI-12)

| Contaminant | Clean-up Level (ug/l) | CONCENTRATION IN PPB | | | | | | | | | |
|-------------|-----------------------|----------------------|-----------|----------|-----------|----------|-----------|----------|-----------|-----------|-----------|
| | | 1-6 1997 | 7-12 1997 | 1-6 1998 | 7-12 1998 | 1-6 1999 | 7-12 1999 | 1-6 2000 | 7-12 2000 | Aug. 2001 | Nov. 2001 |
| Benzene | 1 | < 1.0 | < 1.0 | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 5.0 | NS |

| | | | | | | | | | | | |
|-----------------------|--------|-------|------------|-------|-------|-------|--------|---------|---------|--------------|----|
| Ethylbenzene | 700 | < 1.0 | < 1.0 | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 5.0 | NS |
| Toluene | 2,000 | < 1.0 | < 1.0 | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 5.0 | NS |
| Xylene | 10,000 | < 1.0 | 2.6 | <5.0 | <3.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | NS |
| Naphthalene | 20 | NS | < 1.0 | <1.7 | <0.10 | NS | < 0.09 | < 0.1 | < 0.096 | 0.03 | NS |
| Benzo(a)pyrene | 0.2 | NS | < 1.0 | <0.11 | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | 0.005 | NS |
| Benzo(a)anthracene | 0.1 | NS | < 1.0 | <0.11 | <0.10 | NS | < 0.01 | < 0.011 | < 0.011 | < 0.1 | NS |
| Benzo(b)fluoranthene | 0.2 | NS | < 1.0 | <0.33 | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | < 0.1 | NS |
| Benzo(k)fluoranthene | 0.2 | NS | < 1.0 | <0.11 | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | < 0.1 | NS |
| Chrysene | 0.2 | NS | < 1.0 | <0.11 | <0.10 | NS | < 0.03 | < 0.034 | < 0.032 | < 0.1 | NS |
| Dibenz(a,h)anthracene | 0.3 | NS | < 1.0 | <0.22 | <0.10 | NS | < 0.06 | < 0.069 | < 0.064 | < 0.1 | NS |
| Indenopyrene | 0.4 | NS | < 1.0 | <0.22 | <0.10 | NS | < 0.01 | < 0.011 | < 0.011 | < 0.1 | NS |

Table 3d - Semi-Annual Comparison of Ground Water Concentrations (Well No. FI-I)

| Contaminant | Clean-up Level (ug/l) | CONCENTRATION IN PPB | | | | | | | | | |
|-----------------------|-----------------------|----------------------|-----------|----------|-----------|----------|-----------|----------|-----------|--------------|-----------|
| | | 1-6 1997 | 7-12 1997 | 1-6 1998 | 7-12 1998 | 1-6 1999 | 7-12 1999 | 1-6 2000 | 7-12 2000 | Aug. 2001 | Nov. 2001 |
| Benzene | 1 | < 1.0 | < 1.0 | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 5.0 | NS |
| Ethylbenzene | 700 | < 1.0 | < 1.0 | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 5.0 | NS |
| Toluene | 2,000 | < 1.0 | < 1.0 | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 5.0 | NS |
| Xylene | 10,000 | < 1.0 | < 1.0 | <5.0 | <3.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | NS |
| Naphthalene | 20 | NS | NS | NS | <0.10 | NS | < 0.09 | < 0.1 | < 0.096 | 0.03 | NS |
| Benzo(a)pyrene | 0.2 | NS | NS | NS | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | 0.005 | NS |
| Benzo(a)anthracene | 0.1 | NS | NS | NS | <0.10 | NS | < 0.01 | < 0.011 | < 0.011 | < 0.1 | NS |
| Benzo(b)fluoranthene | 0.2 | NS | NS | NS | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | < 0.1 | NS |
| Benzo(k)fluoranthene | 0.2 | NS | NS | NS | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | < 0.1 | NS |
| Chrysene | 0.2 | NS | NS | NS | <0.10 | NS | < 0.03 | < 0.034 | < 0.032 | < 0.1 | NS |
| Dibenz(a,h)anthracene | 0.3 | NS | NS | NS | <0.10 | NS | < 0.06 | < 0.069 | < 0.064 | < 0.1 | NS |
| Indenopyrene | 0.4 | NS | NS | NS | <0.10 | NS | < 0.01 | < 0.011 | < 0.011 | < 0.1 | NS |

Table 3e - Semi-Annual Comparison of Ground Water Concentrations (Well No. MW-13)

| Contaminant | Clean-up Level (ug/l) | CONCENTRATION IN PPB | | | | | | | | | |
|-------------|-----------------------|----------------------|-----------|----------|-----------|----------|-----------|----------|-----------|-----------|-----------|
| | | 1-6 1997 | 7-12 1997 | 1-6 1998 | 7-12 1998 | 1-6 1999 | 7-12 1999 | 1-6 2000 | 7-12 2000 | Aug. 2001 | Nov. 2001 |
| Benzene | 1 | NS | NS | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 5.0 | < 5.0 |

| | | | | | | | | | | | |
|-----------------------|--------|----|----|-------|-------|-------|--------|---------|---------|--------------|--------------|
| Ethylbenzene | 700 | NS | NS | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 5.0 | < 5.0 |
| Toluene | 2,000 | NS | NS | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 5.0 | < 5.0 |
| Xylene | 10,000 | NS | NS | <5.0 | <3.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Naphthalene | 20 | NS | NS | <1.7 | <0.10 | NS | < 0.09 | < 0.1 | < 0.096 | < 0.1 | 0.03 |
| Benzo(a)pyrene | 0.2 | NS | NS | <0.11 | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | 0.007 | < 0.1 |
| Benzo(a)anthracene | 0.1 | NS | NS | <0.11 | <0.10 | NS | < 0.01 | < 0.011 | < 0.011 | 0.009 | < 0.1 |
| Benzo(b)fluoranthene | 0.2 | NS | NS | <0.33 | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | 0.008 | < 0.1 |
| Benzo(k)fluoranthene | 0.2 | NS | NS | <0.11 | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | 0.007 | < 0.1 |
| Chrysene | 0.2 | NS | NS | <0.11 | <0.10 | NS | < 0.03 | < 0.034 | < 0.032 | < 0.1 | < 0.1 |
| Dibenz(a,h)anthracene | 0.3 | NS | NS | <0.22 | <0.10 | NS | < 0.06 | < 0.069 | < 0.064 | < 0.1 | < 0.1 |
| Indenopyrene | 0.4 | NS | NS | <0.22 | <0.10 | NS | < 0.01 | < 0.011 | < 0.011 | < 0.1 | 0.027 |

Table 3f - Semi-Annual Comparison of Ground Water Concentrations (Well No. MW-14)

| Contaminant | Clean-up Level (ug/l) | CONCENTRATION IN PPB | | | | | | | | | |
|-----------------------|-----------------------|----------------------|-----------|----------|-----------|----------|-----------|----------|-----------|-----------|--------------|
| | | 1-6 1997 | 7-12 1997 | 1-6 1998 | 7-12 1998 | 1-6 1999 | 7-12 1999 | 1-6 2000 | 7-12 2000 | Aug. 2001 | Nov. 2001 |
| Benzene | 1 | NS | NS | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 5.0 | < 5.0 |
| Ethylbenzene | 700 | NS | NS | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 5.0 | < 5.0 |
| Toluene | 2,000 | NS | NS | <2.0 | <1.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 5.0 | < 5.0 |
| Xylene | 10,000 | NS | NS | <5.0 | <3.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 | < 5.0 |
| Naphthalene | 20 | NS | NS | <1.7 | <0.10 | NS | < 0.09 | < 0.1 | < 0.096 | < 0.1 | 0.031 |
| Benzo(a)pyrene | 0.2 | NS | NS | <0.11 | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | < 0.1 | < 0.1 |
| Benzo(a)anthracene | 0.1 | NS | NS | <0.11 | <0.10 | NS | < 0.01 | < 0.011 | < 0.011 | < 0.1 | < 0.1 |
| Benzo(b)fluoranthene | 0.2 | NS | NS | <0.33 | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | < 0.1 | < 0.1 |
| Benzo(k)fluoranthene | 0.2 | NS | NS | <0.11 | <0.10 | NS | < 0.02 | < 0.023 | < 0.021 | < 0.1 | < 0.1 |
| Chrysene | 0.2 | NS | NS | <0.11 | <0.10 | NS | < 0.03 | < 0.034 | < 0.032 | < 0.1 | < 0.1 |
| Dibenz(a,h)anthracene | 0.3 | NS | NS | <0.22 | <0.10 | NS | < 0.06 | < 0.069 | < 0.064 | < 0.1 | < 0.1 |
| Indenopyrene | 0.4 | NS | NS | <0.22 | <0.10 | NS | < 0.01 | < 0.011 | < 0.011 | < 0.1 | < 0.1 |

Table 3g - Semi-Annual Comparison of Ground Water Concentrations (Well No. EX-3)

| Contaminant | Clean-up Level (ug/l) | CONCENTRATION IN PPB | | | | | | | | | |
|-------------|-----------------------|----------------------|-----------|----------|-----------|----------|-----------|----------|-----------|-----------|-----------|
| | | 1-6 1997 | 7-12 1997 | 1-6 1998 | 7-12 1998 | 1-6 1999 | 7-12 1999 | 1-6 2000 | 7-12 2000 | Aug. 2001 | Nov. 2001 |
| Benzene | 1 | NS | < 1.0 | <2.0 | NS | NS | NS | < 2.0 | < 2.0 | NS | < 5.0 |

| | | | | | | | | | | | |
|-----------------------|--------|----|-------|-------|----|----|----|---------|---------|----|-------|
| Ethylbenzene | 700 | NS | < 1.0 | <2.0 | NS | NS | NS | < 2.0 | < 2.0 | NS | < 5.0 |
| Toluene | 2,000 | NS | < 1.0 | <2.0 | NS | NS | NS | < 2.0 | < 2.0 | NS | < 5.0 |
| Xylene | 10,000 | NS | < 1.0 | <5.0 | NS | NS | NS | < 5.0 | < 5.0 | NS | < 5.0 |
| Naphthalene | 20 | NS | < 1.0 | <1.7 | NS | NS | NS | < 0.1 | < 0.096 | NS | < 0.1 |
| Benzo(a)pyrene | 0.2 | NS | < 1.0 | <0.11 | NS | NS | NS | < 0.023 | < 0.021 | NS | < 0.1 |
| Benzo(a)anthracene | 0.1 | NS | < 1.0 | <0.11 | NS | NS | NS | < 0.011 | < 0.011 | NS | < 0.1 |
| Benzo(b)fluoranthene | 0.2 | NS | < 1.0 | <0.33 | NS | NS | NS | < 0.023 | < 0.021 | NS | < 0.1 |
| Benzo(k)fluoranthene | 0.2 | NS | < 1.0 | <0.11 | NS | NS | NS | < 0.023 | < 0.021 | NS | < 0.1 |
| Chrysene | 0.2 | NS | < 1.0 | <0.11 | NS | NS | NS | < 0.034 | < 0.032 | NS | < 0.1 |
| Dibenz(a,h)anthracene | 0.3 | NS | < 1.0 | <0.22 | NS | NS | NS | < 0.069 | < 0.064 | NS | < 0.1 |
| Indenopyrene | 0.4 | NS | < 1.0 | <0.22 | NS | NS | NS | < 0.011 | < 0.011 | NS | < 0.1 |

No potentially toxic or mobile transformation products have been identified during sampling events that were not already present at the time of the ROD.

Current information from the one-year trial period for MNA has not established whether or not the ground water plume will remain on site once the pump and treat system is turned off for an extended period of time. At the end of the trial period, a determination will be made as to the status of the plume and the possible change in the future ground water remedy.

Site Inspection

An inspection at the site was conducted on June 27, 2002, by the RPM and an EPA technical advisor. The purpose of the inspection was to assess the protectiveness of the remedy, including the presence of fencing to restrict access, the use of locks to prevent tampering with monitoring wells, and to ascertain the condition of the pump and treat system.

No significant issues were identified regarding the monitoring wells, the pump and treat system, or the fencing. However, some areas of concern were noted. Examination of the fence revealed a damaged area on the eastern side located near the ground. Missing from the site was a sign designating the area as a Superfund site. Another minor issue was the presence of trees growing along the fence line.

The ICs that are in place restrict ground water and land use inside the fencing which could possibly provide contact with contaminants. During the site inspection, work was being conducted to install an electrical substation within the fenced portion of the site. Prior approval for the installation was received from EPA and the state of Iowa. Permits for the construction work and disposal practices are on file and up to date.

The pump and treat system is currently not in operation. A one-year trial was authorized to determine if MNA would be a viable option for ground water remediation at the site. The

pump and treat ground water system has remained in place and was completely operational and available to be turned on immediately upon request by EPA.

Although some files were kept on site, the full file is located at the Black & Veatch office in Overland Park, Kansas. Black & Veatch is a consultant for Alliant Energy at the FCGP site. A visit to review the site file, including annual O&M costs, occurred on July 17, 2002, at the Black & Veatch office in Overland Park. All relevant files were readily available and up to date.

Interviews

Interviews were conducted with two individuals connected to the site. Dean Hargens, project manager for Alliant Energy, and Cary Hirner, geological engineer for Black & Veatch. These interviews took place on June 27, 2002, at the conclusion of the site visit. No significant problems or unusual situations regarding the site were identified during the interviews. There were no known problems with the implementation of ICs or with system operations and O&M costs.

VII. Technical Assessment

Question A

Is the remedy functioning as intended by the decision documents?

The review of documents, applicable or relevant and appropriate requirements (ARARs), and the results of the site inspection indicate that the remedy is functioning as intended by the ROD. The excavation and removal of the source areas achieved the remedial objectives to minimize the migration of contaminants to ground water and surface water and prevent direct contact with, or ingestion of, contaminants in soil and sediment. The effective implementation of ICs has prevented exposure to, or ingestion of, contaminated ground water.

For the past decade, contaminated ground water has been addressed at the site using pump and treat technology in accordance with the EPA ROD and the Consent Decree, Civil Action 4-91-CV-80313. Ground water has been pumped from two wells located in areas of highly contaminated ground water that contains tar in the form of dense nonaqueous phase liquid (DNAPL). Ground water sampling indicates that the extent of the contaminant plume has not migrated off the Alliant Energy property boundary. Treatment of contaminated ground water was being achieved at a rate less than 0.2 gallons per minute. Attempts to maximize the DNAPL extraction were unsuccessful. On July 30, 2001, the pump and treat system was temporarily shut down to conduct a year-long test to determine if MNA would improve the efficiency of the ground water clean up. During this one-year trial, ground water monitoring was increased to quarterly sampling instead of semi-annually. Additional wells were also installed to better capture the possible migration of the plume off site.

A well-maintained fence with locked gates provides the appropriate access control for the

site, and monitoring wells are capped and/or locked to prevent tampering. ICs regarding site access and the use of ground water beneath the site are in place through the Consent Decree signed in 1991. The excavation and incineration of contaminated source areas and soil were completed in 1995, and O&M activities on the ground water treatment system and fencing are conducted on a regular basis.

Question B

Are the exposure assumptions, toxicity data, clean-up levels, and RAOs used at the time of the remedy still valid?

There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy.

Changes in Standards and To Be Considered

Changes in both soil and ground water standards have occurred since remediation goals for the remedy were established over ten years ago.

Table 4 - Clean-up Standards for Soil

| Contaminant | Remediation Level established (mg/kg) | Current Preliminary Remediation Goals (mg/kg) |
|--------------|---------------------------------------|---|
| Benzene | 100 | 1.5 |
| Ethylbenzene | 500 | 230 |
| Toluene | 500 | 520 |
| Xylene | 500 | 210 |

Federal and state soil clean-up standards for the contaminants of concern were not established at the time of the ROD. The EPA and state determined the soil clean-up standards for the contaminants of concern on a site-specific basis using carcinogenic risk factors. With proper ICs in place at the site, a 10^{-4} risk level was determined to be protective of human health and the environment. Based on this risk level, the clean-up level for soil was 500 ppm for total PAH contaminants and 100 ppm for carcinogenic PAH contaminants. Since 1990, EPA has established Preliminary Remediation Goals (PRGs) in industrial soils for benzene, ethylbenzene, toluene, and xylene. Although current remediation goals for benzene, ethylbenzene, and xylene are lower than the remediation goals previously established, the protectiveness of the remedy is not affected because contaminated soil of concern was excavated and incinerated off site.

Table 4 - Clean-up Standards for Ground Water

| Contaminant | Remediation Level established (ug/l) | Standard/Detection Limit Used in Establishing Remediation Goals | Current MCLs (ug/L) |
|---|--------------------------------------|---|---------------------|
| Benzene | 1 | NRL | 5 |
| Ethylbenzene | 700 | HAL | 700 |
| Toluene | 2,000 | HAL | 100 |
| Xylene | 10,000 | HAL | 1000 |
| Naphthalene | 20 | HAL | 100* |
| Benzo(a)pyrene | 0.2 | PDL | 0.2 |
| Benzo(a)anthracene | 0.1 | PDL | -- |
| Benzo(b)fluoranthene | 0.2 | PDL | -- |
| Benzo(k)fluoranthene | 0.2 | PDL | -- |
| Chrysene | 0.2 | PDL | -- |
| Dibenz(a,h)anthracene | 0.3 | PDL | -- |
| Indenopyrene | 0.4 | PDL | -- |
| *Lifetime Health Advisory Level NRL - EPA Negligible Cancer Risk Level HAL - Lifetime Health Advisory Level PDL - Practical Detection Level MCL-Maximum Contaminant Level | | | |

At the time of the ROD, federal and state ground water clean-up standards had been established for some of the contaminants of concern at the FCGP site. The EPA had established the Safe Drinking Water Act National Primary Drinking Water Standards' Maximum Contaminant Levels (MCLs) as clean-up criteria for drinking water. The Iowa Administrative Code Chapter 133, effective August 16, 1989, established clean-up levels for contaminated ground water in Iowa. The level to first be considered was the EPA negligible risk level (NRL), then the EPA lifetime health advisory level (HAL), and finally MCLs. The practical detection limits for laboratory analysis were designated as ground water clean-up standards for some of the contaminants which did not have standards already established. Table 4 provides the clean-up standards for ground water and the basis for the standards established in the ROD. Toluene and xylene both have lower clean-up standards today than those which were established in the ROD. However, the main principal behind the ground water remedy is containment. Therefore, the protectiveness of the remedy is not affected by the differences in the values. ICs are in place to control activities on site that would result in exposure to ground water, and monitoring wells are sampled on a regular basis to insure the contaminated plume is not migrating off site.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures (off-site residents) and future exposures (off-site workers, on-site workers, and off-site residents). The following pathways were evaluated:

- Exposure of current residents to off-site contaminated ground water through occasional ingestion of well water during outside activities, ingestion of garden produce watered with contaminated ground water, and inhalation of contaminants volatilized during watering;
- Exposure of future workers on site and off site to contaminated soil through dermal contact and ingestion; and
- Exposure of future residents to off-site contaminated ground water used as a primary potable water source.

Land use and expected land use on or near the site have not changed to effect the assumptions posed in the Human Health Risk Assessment. No newly identified contaminants or contaminant sources have been discovered. PRGs used at the site represented a 1×10^{-4} (or 1 in 10,000) cancer risk. The established remediation levels were compared to EPA, Region 9's, current PRG tables. Although some contaminants of concern at the FCGP site showed a lower clean-up goal by today's standards, the change in toxicity values does not affect the protectiveness of the remedy. Soil excavation on site removed source areas of high contamination, while the ground water is being contained on site, where it is under ICs which prevent unacceptable exposure.

Changes in Risk Assessment Methods.

The only change in standard risk assessment methods since 1990 involves exposure to contaminated soil via the dermal pathway. However, since large quantities of contaminated soil were removed from the site, changes in the assessment of the dermal pathway do not affect the protectiveness of the remedy.

Expected Progress Towards Meeting RAOs.

The remedy is progressing as expected. Two RAOs were established for the FCGP site. The RAO to remove and contain contaminated source area materials has been completed. The RAO to prevent or minimize the potential for future inhalation, ingestion, or dermal contact with contaminants in ground water is slow, but progressing at an expected pace. Studies are currently underway to determine if MNA may work as an alternative to the current ground water pump and treat system.

Question C

Has any other information come to light that could call into question the protectiveness of the remedy?

Since no off-site contaminant releases were likely to impact significant environmental resources, an ecological risk assessment was not conducted for the site. No significant impacts were identified during the five-year review. Therefore, monitoring of ecological targets was not necessary for this review. No weather-related events or natural disasters have affected the protectiveness of the remedy. There is no additional information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the ROD. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. Changes have been made in the standard risk assessment methods regarding the dermal pathway. However, the protectiveness of the remedy is not affected by this pathway due to the fact that soil was excavated from the site and incinerated off site. Some contaminants of concern at the FCGP site do show a lower clean-up goal by today's standards than those established in 1990. These variations do not affect the protectiveness of the remedy because soil at levels of concern are no longer on site, and the contaminated ground water plume is monitored and contained on site where its use is restricted through ICs. There is no additional information that calls into question the protectiveness of the remedy.

VIII. Issues

No major issues regarding the protectiveness of the remedy were discovered during the five-year review; however, three areas of concern were noted. These three items are listed in Table 5.

Table 5 - Issues

| Issue | Currently Affects Protectiveness (Y/N) | Affects Future Protectiveness (Y/N) |
|---|--|-------------------------------------|
| Section of fence damaged on eastern side of the site. | N | N |
| Warning sign not posted on fence. | N | N |
| Trees growing along fence line. | N | N |

IX. Recommendations and Follow-up Actions

Table 6 provides recommendations and follow-up actions for the issues that need to be addressed by Alliant Energy to insure site integrity.

Table 6 - Recommendations and Follow-Up Actions

| Issue | Recommendations/ Follow-Up Actions | Party Responsible | Oversight Agency | Milestone Date | Affects Protectiveness? (Y/N) | |
|------------------------|--|----------------------|---------------------|-------------------|-------------------------------------|--------|
| | | | | | Current | Future |
| Damaged fence | Repair section of fence that is damaged. | Alliant Energy | EPA/State | 12/31/02 | N | N |
| Warning signs | Post new signs with the appropriate wording. | Alliant Energy | EPA/State | 12/31/02 | N | N |
| Trees along fence line | Cut trees around the fencing on a regular basis. | Alliant Energy | EPA/State | 12/31/02 | N | N |

X. Protectiveness Statement(s)

The remedy is expected to be protective of human health and the environment upon attainment of the ground water clean-up goals or as long as the contaminated ground water plume is contained on site. In the interim, institutional controls are preventing exposure to, or the ingestion of, contaminated ground water. Contaminated soil at the site has been addressed through excavation and incineration, as well as the installation of fencing, warning signs, and ICs.

Current data indicate that the plume remains on site. Long-term protectiveness of the RA will be verified by continuing to obtain additional ground water samples which will fully evaluate potential migration of the contaminant plume from the site.

XI. Next Review

Since hazardous substances, pollutants, or contaminants remain at the site at levels above clean-up standards established for this RA, and which will not allow for unlimited use or unrestricted exposure, the EPA will conduct additional five-year reviews. The next five-year review for the Fairfield Coal Gasification Plant site is required by September 23, 2007, five years from the date of this review.

ATTACHMENTS

ATTACHMENT 3

List of Documents Reviewed

Consent Decree, United States of America v. Iowa Electric Light And Power Company, August 14, 1991.

EPA Semiannual Operations And Maintenance Reports, Ground Water Treatment System, 1996 through 2002.

Five-Year Review, Type I, Fairfield Coal Gasification Plant Site, Fairfield, Iowa, October 3, 1997.

Operations And Maintenance Manual, Ground Water Extraction & Treatment System, Volume I, March 1992.

Record of Decision, Fairfield Coal Gasification Site, Fairfield, Iowa, September 1990.

Remedial Action Report For Ground Water, Remedial Action At The Fairfield Coal Gasification Site, Fairfield, Iowa, January 1993.

Remedial Action Report For The Source Material And Contaminated Soils At The Fairfield Coal Gasification Site, Fairfield, Iowa, August 1995.

Remedial Investigation/Feasibility Study Report, Fairfield, Iowa, Former Manufactured Gas Plant Site, June 1990.

Revised Approach To Ground Water Management, Fairfield, Iowa, Former Manufactured Gas Plant Site, April 2001.

ATTACHMENT 4

Applicable or Relevant and Appropriate Requirements (ARARs)

| <u>Federal - Chemical Specific ARARs</u> | | | | |
|--|------------------------------|--|---|---|
| Requirement | Citation | Description | Applicable /Relevant and Appropriate | Comment |
| Safe Drinking Water Act | 40 U.S.C. Sect. 300 | | | |
| National Primary Drinking Water Standards (MCLs) | 40 C.F.R. Part 141 | Establishes health-base standards for public water systems (maximum contaminant levels). | Yes | The MCLs for organic and inorganic contaminants are relevant and appropriate for the remediation of ground water contamination since the risk assessment evaluates potential future use of the ground water as a drinking source. |
| Maximum Contaminant Levels Goals (MCLGs) | 40 C.F.R. 141.50 141.51 | Establishes drinking water quality goals. | No | No non-zero MCLGs were associated with the contaminants present. |
| Solid Waste Disposal Act (SWDA) | 40 U.S.C. Sect. 6901-6987 | | | |
| Identification and Listing of Hazardous Waste | 40 C.F.R. Part 261 | Defines those solid wastes which are subject to regulation as hazardous wastes under 40 C.F.R. Parts 262-265 and Parts 124, 270 and 271. | (see *) | * RCRA requirements are applicable if wastes are TCLP characteristic. If not TCLP characteristic, RCRA requirements are relevant and appropriate, and substantive requirements will be met. |

| Requirement | Citation | Description | Applicable /Relevant and Appropriate | Comment |
|---|---|--|---|---|
| Clean Air Act | 42 U.S.C. Sect. 7401-7642 | | | |
| National Primary and Secondary Ambient Air Quality Standards (NAAQA) | 40 C.F.R. Part 50 | Establishes standards for ambient air quality to protect health and welfare. | Yes | NAAQS may be applicable to the Fairfield FMGP site during remedial actions. |
| <u>State - Chemical Specific ARARs</u> | | | | |
| Iowa Environmental Quality Act: Rules for Determining Clean-up Actions and Responsible Parties. | Iowa Code Chapter 133 Effective 8/16/89 | Establishes clean-up levels for contaminated ground water and soil. | Yes | These regulations are applicable to any soil or ground water contaminated above Iowa action levels. |
| <u>Federal - Action Specific ARARS</u> | | | | |
| Solid Waste Disposal Act (SWDA) | 42 U.S.C. Sect. 6901-6987 | | | |
| Criteria for classification of Solid Waste Disposal Facilities and Practices | 40 C.F.R. Part 257 | Defines "Solid Waste". Establishes criteria for use in determining which solid wastes disposal facilities and practices pose a reasonable probability of adverse effects on health and thereby constitute prohibited open dumps. | Yes | Wastes at the Fairfield site are solid wastes and the site is an open dump. This part would be applicable to remedial alternatives that involve the disposal off site of solid wastes as defined in Subtitle D. |
| Requirement | Citation | Description | Applicable /Relevant and Appropriate | Comment |

| | | | | |
|---|---------------------|--|---|---|
| Hazardous Waste Management Systems General | 40 C.F.R. Part 260 | Establishes procedure and criteria for modification or revocation of any provision in 40 C.F.R. Part 260-265. | (see *) | * RCRA requirements are applicable if wastes are TCLP characteristic. If not TCLP characteristic, RCRA requirements are relevant and appropriate, and substantive requirements will be met. |
| Identification and Listing of Hazardous Wastes | 40. C.F.R. Part 261 | Defines those solid wastes which are subject to regulation as hazardous wastes under 40 C.F.R. Parts 262-265 and Parts 124, 240, and 271. | (see *) | * RCRA requirements are applicable if wastes are TCLP characteristic. If not TCLP characteristic, RCRA requirements are relevant and appropriate, and substantive requirements will be met. |
| Standards Applicable to Generators of Hazardous Waste | 40 C.F.R. Part 262 | Establishes standards for generators of hazardous waste. | (see *) | * RCRA requirements are applicable if wastes are TCLP characteristic. If not TCLP characteristic, RCRA requirements are relevant and appropriate, and substantive requirements will be met. |
| Standards Applicable to Transporters of Hazardous Waste | 40 C.F.R. Part 263 | Establishes standards which apply to persons transporting hazardous waste within the U.S. if the transportation requires a manifest under 40 C.F.R. Part 262. | (see *) | * RCRA requirements are applicable if wastes are TCLP characteristic. If not TCLP characteristic, RCRA requirements are relevant and appropriate, and substantive requirements will be met. |
| Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities | 40 C.F.R. Part 264 | Establishes minimum national standards which define the acceptable management of hazardous waste for owners and operators of facilities which treat, store, or dispose of hazardous waste. | (see *) | * RCRA requirements are applicable if wastes are TCLP characteristic. If not TCLP characteristic, RCRA requirements are relevant and appropriate, and substantive requirements will be met. |
| Requirement | Citation | Description | Applicable /Relevant and Appropriate | Comment |

| | | | | |
|--------------------|---------------------------------|---|---|---|
| | 40 C.F.R. Part 264 Subpart B | General Facility Standards 40 C.F.R. 264.14 Security | (see *) | * RCRA requirements are applicable if wastes are TCLP characteristic. If not TCLP characteristic, RCRA requirements are relevant and appropriate, and substantive requirements will be met. |
| | Subpart G | Closure and Post-Closure | (see *) | * RCRA requirements are applicable if wastes are TCLP characteristic. If not TCLP characteristic, RCRA requirements are relevant and appropriate, and substantive requirements will be met. |
| | Subpart J | Tanks | Yes | If TCLP characteristic, not applicable because wastes are treated in tanks within a 90 day time frame. Substantive requirements will be met. |
| | Subpart L | Waste Piles | Yes | If TCLP characteristic, these requirements are not applicable because wastes are treated within a single area of contamination. Substantive requirements will be met. |
| | Subpart O | Incinerators | (see *) | * RCRA requirements are applicable if wastes are TCLP characteristic. If not TCLP characteristic, RCRA requirements are relevant and appropriate, and substantive requirements will be met. |
| Requirement | Citation | Description | Applicable /Relevant and Appropriate | Comment |

| | | | | |
|---|---|--|---|---|
| Standards for the Management of Specific Hazardous Wastes and Specific Types of Hazardous Waste Management Facilities | 40 C.F.R. Part 266 | Boiler Regulations | (see *) | Applicable if hazardous wastes are burned as fuel in industrial furnace or boiler. |
| Hazardous Waste Permit Program | 40 C.F.R. Part 270 | Establishes provisions covering basic EPA permitting requirements. | (see *) | * RCRA requirements are applicable if wastes are TCLP characteristic. If not TCLP characteristic, RCRA requirements are relevant and appropriate, and substantive requirements will be met. |
| Occupational Safety and Health Act | 29 U.S.C. Sect. 651-678 | Regulates worker health and safety | Yes | Under 40 C.F.R. Sect. 300.38 requirements of the Act apply to all response activities under the NCP. |
| Hazardous Waste Operations and Emergency Response, Final Rule | 29 C.F.R. 1910.120 | Establishes training, medical monitoring and workplace regulations and standards for all work done at hazardous waste sites. | Yes | These regulations are applicable to all remedial activities conducted at the Fairfield site. |
| Clean Water Act | 33 U.S.C. Sect. 1251 - 1376 | | | |
| Ambient Water Quality Criteria Guidelines (AWQCG) | 40 C.F.R. Part 131 Quality Criteria for water, 1976, 1980, 1986 | Sets criteria for water quality based on toxicity to aquatic organisms and human health. | Yes | AWQCGs for PAHs and aromatics are relevant and appropriate to all remedies which discharge ground water to a POTW or surface water. |
| Requirement | Citation | Description | Applicable /Relevant and Appropriate | Comment |

| | | | | |
|--|--|--|---|---|
| National Pretreatment Standards | 40 C.F.R. Part 403 | Sets standards to control pollutants which pass through or interfere with treatment processes in publicly owned treatment works (POTW) or which may contaminate sewage sludge. | Yes | These standards are applicable to all alternatives that involve discharge to POTW. |
| Clean Air Act | 42 U.S.C. Sect. 7401 - 7642 | | | |
| National Ambient Air Quality Standards/ NESHAPS/INSPS/ BACT/PSD/LAER | 40 C.F.R. 60.1 - 17, 50 - 54, 150 - 154, 480 - 489, 40 C.F.R. 53.1 - 33, 40 C.F.R. 61.01 - 18, 50 - 112, 240 - 247 | Sets treatment technology standards for emissions to air from: - Incinerators - fugitive emissions | Yes | These requirements are applicable to any alternatives that involve emissions regulated by these standards. |
| Hazardous Materials Transportation Act | 49 U.S.C. Sect. 1801-1813 | | | |
| Hazardous Materials Transportation Regulations | 49 C.F.R. Parts 107, 171-177 | Regulates transportation of hazardous materials. | Yes | These requirements are applicable to all alternatives that involve transport of contaminated materials from the site. |
| <u>State - Action Specific ARARS</u> | | | | |
| Iowa Environmental Quality Act | Enacted 1972, as amended, chapter 455B of Iowa Code Annotated. | | | |
| Requirement | Citation | Description | Applicable /Relevant and Appropriate | Comment |

| | | | | |
|--|-----------------------------------|--|---|--|
| | 455B.430 | The permission of IDNR's Director is required to change the use of a site on the Registry of abandoned or uncontrolled disposal sites. | Yes | The Fairfield site is an uncontrolled wasted site as defined by the Act. Therefore this section of the law is applicable. |
| Iowa Air Pollution Control Regulations | 22.4 or 22.5 | Establishes requirements for major stationary sources in attainment/unclassified areas (22.4) or nonattainment areas (22.5) | Yes | These regulations (either 22.4 or 22.5) are applicable to any remedial activities taken at the site, such as incineration or excavation. |
| | 23.1 Emission Standards | Establishes emission standards for new sources and for hazardous air pollutants. | Yes | These regulations would be applicable to certain new sources such as incinerators and to emissions of hazardous pollutants. |
| | 23.3 (455B) Specific Contaminants | Establishes standards for various contaminants. | Yes | These regulations would apply to remedial actions. |
| | 62.1(6) | Prohibits discharges to POTWs without a pretreatment agreement. | Yes | These prohibitions would apply to any offsite discharges to a POTW. |
| | (3) and (4) | Adopts the following Federal regulations: 40 C.F.R. Part 403 and 40 C.F.R. Part 125, Subpart H. | Yes | These regulations would be applicable to discharge from the site to a POTW. |
| Iowa Water Pollution Control Regulations | 62.6 | Establishes how IDNR will set effluent limitations or pretreatment requirements for pollutants for which there are no federal standards. | Yes | These regulations would be applicable to discharge from the site to a POTW. |
| Requirement | Citation | Description | Applicable /Relevant and Appropriate | Comment |

| | | | | |
|---|--|--|-----|---|
| | 62.8 (3) and (4) | Establishes how IDNR may set pretreatment requirements which are more stringent than current standards if necessary. | Yes | These requirements may be applied to any discharges from the site to a POTW, if IDNR deems it necessary. |
| | 63 Monitoring, Analytical and Reporting Requirements | This chapter establishes requirement for these activities. | Yes | Off-site disposal options must comply with all portions of this chapter. Onsite disposal options must comply with the substantive requirements (63.3(1) through 63.3(4)). |
| | 64.2(3) | Establishes siting criteria that must be complied with when building a new wastewater disposal system. | Yes | These regulations would apply to any treatment system built to remediate the ground water. |
| | 64.3(5) | Requirements for industries that discharge to another disposal system. | Yes | These regulations would apply to any remedial option that discharged treated water to a POTW. |
| <u>No Location Specific ARARs are applicable or relevant and appropriate to the Fairfield site</u> | | | | |

APPENDICES

APPENDIX 1



STATE OF IOWA

THOMAS J. VILSACK, GOVERNOR
SALLY J. PEDERSON, LT. GOVERNOR

DEPARTMENT OF NATURAL RESOURCES
JEFFREY R. VONK, DIRECTOR

RECEIVED

SEP 10 2002

SUPERFUND DIVISION

September 5, 2002

Tonya Howell
Remedial Project Manager
Superfund Division
US EPA Region VII
901 N 5th Street
Kansas City, KS

Dear Ms. Howell:

This letter is in response to your e-mail of August 21, 2002 and the attachment "Draft Second Five-Year Review Report for the Fairfield Coal Gasification Plant site" in Fairfield, Iowa.

The Iowa Department of Natural Resources (IDNR) approves the Draft Five-Year Review Report prepared by your office. IDNR is in general agreement with the issues, recommendations and follow-up actions that are reflected in the report, in particular, the next five-year review plan.

Please always feel free to call me with any question at 515/281-8925 or e-mail me at johanshir.golchin@dnr.state.ia.us

Sincerely,

A handwritten signature in black ink, appearing to read "Johanshir Golchin".

Johanshir Golchin

Cc: Mick Leat and Cal Lundberg, Ph. D., IDNR

APPENDIX 2

APPENDIX 3



**U.S. Environmental Protection Agency (EPA) Region 7
conducts
Five-Year Review for the
Fairfield Coal Gasification Superfund Site
Fairfield, Iowa**

EPA is conducting the second Five-Year review at the Fairfield Coal Gasification Superfund site. The review is done to make sure the cleanup continues to protect people and the environment.

Additional information regarding the site is available at the following locations:

Fairfield Public Library
Court & Washington Streets
Fairfield, Iowa 52556

EPA Record Center
901 N. 5th Street
Kansas City, Kansas 66101

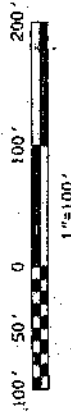
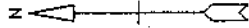
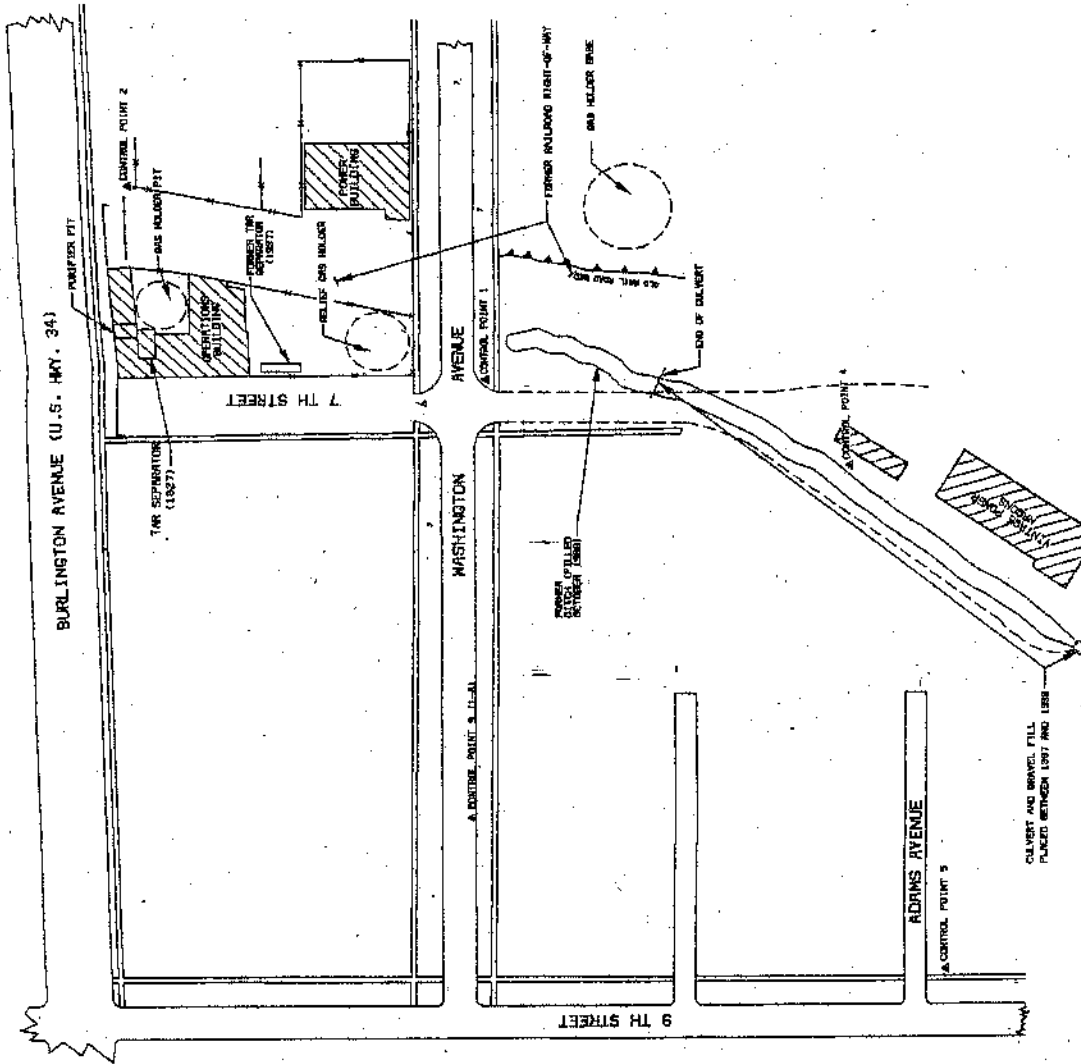
For more information, please contact:

Fritz Hirter, EPA
(913) 551-7003
Toll-free: (800) 223-0425
E-mail: hirter.fritz@epa.gov

LEGEND

▲ CONTROL POINT (SURVEY)

▲ CONTROL POINT 3



ATTACHMENT 1
SITE LOCATION MAP

ATTACHMENT 2 SITE PLAN

FI-6



BURLINGTON AVENUE (U.S. HWY. 34)

FI-29

MGP
SITE

FI-3D
FI-3

EX-4

FI-4

FI-13

WASHINGTON

AVENUE

GROUND WATER
TREATMENT
BUILDING

MW-16

EX-1

MW-15

GAS
HOLDER
BASE

MW-13

MW-14

ALLEY

FI-10

EX-3

FI-12

ADAMS

AVENUE

FI-1
1 BLOCK TO
THE SOUTH

FI-11

LEGEND

- ◆ FI-10 EXISTING MONITORING WELL
- EX-1 EXTRACTION WELL WITH MANHOLE
- — — EXISTING FENCE

100' 50' 0 100' 200'



1"=100'

ATTACHMENT 3

ATTACHMENT 4

ATTACHMENT 5